Developing Programs of Study

Focused Academic and Technical Preparation for 21st Century Careers

Presented by Distribution Point Projects

Developing Programs of Study

"California Education Code Section 51228 states, "Each school district maintaining any of grades 7 to 12 inclusive, shall offer to all otherwise qualified pupils in those grades a course of study that provides an opportunity for those pupils to attain entry-level employment skills in business or industry upon graduation from high school. Districts are encouraged to provide all students with a rigorous academic curriculum that integrates academic and career skills, incorporates and applies learning in all disciplines, and prepares all pupils for high school graduation and career entry."

This guide provides an introduction to developing *Programs of Study* in California. A Program of Study is a multi-year sequence of academic and technical courses that provides students with a structured progression of secondary and post-secondary instruction toward a specified career area. By incorporating academic and technical content into a logical sequence with clear connections and minimal repetition, *Programs of Study* set a clear path of career technical coursework from middle school through college to a rewarding career.

Programs of Study are instructional frameworks that exhibit a strategy for how to:

- integrate core academic curriculum
- integrate core technical curriculum
- integrate project and work-based learning
- develop supportive services necessary to ensure student success.

Programs of Study are grounded in the notion that members of the community, which can include: business and industry, counselors, principals, parents, and students, should be engaged in the development of *Programs of Study* throughout the entire process. A total community effort is necessary to properly prepare students for high-skill, high-wage and high-demand occupations.

Perkins IV: The Federal Foundation

In preparation for the expansion of knowledge- and skills-based occupations in the 21st Century, Congress enacted the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Perkins IV) to provide students with the academic and technical skills to succeed in these fields. Perkins IV calls for individual states to offer career and technical *Programs of Study* to facilitate the transition from secondary to postsecondary education and on to successful careers.

Some of the fundamental objectives outlined in Perkins IV include:

- Accountability and program improvement at all levels
- Increased coordination within the CTE system
- Stronger integration of academic and career technical teaching and learning
- Increased alignment of secondary and postsecondary education (Programs of Study)
- Links to business and industry

California's Industry Sectors

The state of California has identified 15 Industry Sectors. Each sector contains multiple career pathways (California has identified a total of 58) in which to develop unlimited *Programs of Study.* It is up to individual school districts and the region's corresponding colleges and businesses to conduct research into the needs of the industry and determine which sectors and careers can best serve the students, industry and community.

General to Specific

Table 1. Industry Sectors.

Industry Sector	Career Pathway	Examples of Career Areas for Programs of Study
Agriculture and Natural Resources	Agricultural Business	Landscape Manager, Ag Marketing, Floral Shop Owner
	Agricultural Mechanics	Irrigation Engineer, Farm Facility Construction
	Agriscience	Ag Chemicals, Plant/Animal Genetics
	Animal Science	Animal Breeding, Fish Farming, Meat Inspector
	Forestry and Natural Resources	Park Ranger, Logging, Ski Resort Manager
	Ornamental Horticulture	Tree Trimming, Greenhouse Work, Entomologist
	Plant and Soil Science	Horticulturist, Irrigation, Botanist
Arts, Media and Entertainment	Media and Design Arts	Graphic Designer, Publicity Director, Animator
	Production and Managerial Arts	Stage Manager, Set Designer, Producer, Video Production.
	Performing Arts	Actor, Announcer, Musician, Choreographer
Building Trades and Construction	Engineering and Heavy Construction	Welding, Ironworker, Cement Mason
	Cabinetmaking and Wood Products	Estimator, Furniture Making, Millwork
	Mechanical Construction	Plumber, Heating, Electrician
	Residential and Commercial Construction	Carpenter, Surveyor, Roofer, Building Inspector
Education, Child Development and Family Services	Child Development	Infant Caregiver, Teacher's Aide, Child Psychologist
	Education	Teacher's Aide, Tutor, Teacher
	Family and Human Services	Community Worker, Social Worker, Family Advocate
	Consumer Services	Credit Counselor, Financial Planner
Energy and Utilities	Electromechanical Installation and Maintenance	Appliance Repair, Utility Technician, Electrical Engineer
	Energy and Environmental Technology	Energy Management, Waste Management
	Residential and Commercial Energy and Utilities	Solar Technician/Engineer, Electrical Technician/Engineer
	Public Utilities	Utilities Technician/Engineer, Power Grid Engineer
Engineering and Design	Architectural and Structural Engineering	Drafter/Designer, Architect, Surveyor
	Computer Hardware, Electrical, and Networking Engineering	Computer Engineer, Electrician, Computer Repair
	Environmental and Natural Science Engineering	Oceanographer, Meteorologist, Ecologist
	Engineering Design	CAD/CAM Technician, Civil Engineering
	Engineering Technology	Electrician/Electronics, Industrial Engineer/Technician

Table 1. Industry Sectors. - continued.

Industry Sector	Career Pathway	Possible Career Areas/Programs of Study
Fashion and Interior Design	Fashion Design, Manufacturing, and Merchandising	Fashion Designer, Pattern Maker, Stylist, Fashion Buyer
	Interior Design, Furnishings, and Maintenance	Interior Designer, Design Assistant, Ergonomic Consultant
Finance and Business	Accounting Services	Accountant, Loan Officer, Bookkeeper, Auditor
	Banking and Related Services	Bank Teller, Credit Analyst, Actuary, Appraiser
	Business Financial Management	Loan Officer, Tax and Claims Examiner, Economist
Health Science and Medical Technology	Biotechnology Research and Development	Biomedical Chemist, Clinical Trials Researcher, Biostatistician
	Diagnostic Services	Medical Laboratory Aide, Geneticist, Radiologist
	Health Information	Medical Records Clerk, Medical Coder
	Therapeutic Services	Medical Assistant, Exercise Physiologist, Dentist
	Support Services	Industrial Hygienist, Mortician, Central Supply Aide
Hospitality, Tourism and Recreation	Food Service and Hospitality	Line Cook, Baker, Caterer
	Hospitality, Tourism, and Recreation	Event/Wedding Planner, Concert Promoter
	Food Science, Dietetics, and Nutrition	Dietary Aide, Personal Chef, Food Scientist
Information Technology	Information Support and Services	Technical Writer, Software Engineer, Business Teacher
	Media Support and Services	Website Developer, Webmaster, Multimedia Producer
	Network Communications	Network Systems Analyst, Computer Security Specialist
	Programming and Systems Development	Software Architect, Operating System Designer
Manufacturing and Product Development	Graphic Arts Technology	Publisher, Editor, Industrial Designer
	Integrated Graphics Technology	Special Effects Animator, Web Designer
	Machine and Forming Technology	Assembler, Computer Programmer, Design Engineer
	Welding Technology	Welder, Blacksmith, Ironworker
Marketing, Sales and Service	E-commerce	Customer Support Specialist, E-Commerce Entrepreneur, E-Commerce Marketing Specialist
	Entrepreneurship	Franchisee, Buyer, Business Owner
	International Trade	Route Sales, Shipping and Receiving, Economist
	Professional Sales and Marketing	Telemarketer, Account Executive, Public Relations
Public Services	Human Services	Child Care, Psychologist, Emergency Services
	Protective Services	Police Officer, Paramedic, Security Guard
	Legal and Government Services	Judge, Criminologist, Lawyer
Transportation	Aviation and Aerospace Transportation Services	Ticket Agent, Pilot, Aviation Engineer
	Vehicle Maintenance, Service, and Repair	Service Writer, Parts Runner, Shop Foreman
	Collision Repair and Refinishing	Auto Detailer, Glass Installer, Vehicle Restoration

Eleven Elements of A High-Quality CTE System

1. Leadership at All Levels
Institutional commitment and leadership at every level, including the institutions' governing boards, is vital to sustaining and expanding CTE. As in any system, effective leadership is needed to articulate and spotlight the need for CTE, galvanize support and resources, ensure sound management and coordination, and facilitate continuous improvement.

2. High-Quality Curriculum and Instruction
CTE is a unique curricular area in education. It offers rigorous integrated technical and academic content, is focused on careers that are intrinsically interesting to students, and delivered through applied, performance project-based teaching strategies that facilitate understanding and mastery. It also instills essential transferable workplace and career management skills that students can draw upon over a lifetime of learning and career development. In addition, CTE is, by necessity, often taught in personalized learning environments – small classes, learning communities, student organizations, and worksites – which further augments the benefits of these programs. Finally, CTE programs are dynamic; curricula need to stay current with rapid changes in the workplace, requiring on-going updates and learning on the part faculty.

High-quality curriculum and instruction in CTE includes the intentional reinforcement of the academic and technical rigor inherent in CTE and the alignment of CTE with academic and industry standards. It also includes the integration of CTE and academic content through a variety of strategies that foster complementary approaches to teaching and learning – strategies that draw on the best of what both CTE and non-CTE disciplines have to offer.

3. Career Exploration and Guidance
Career exploration and guidance are central to CTE. They help ensure that students have access to information and experiences that allow them to envision a wide range of possibilities for their lives and to make informed decisions, both while in their educational programs and throughout their careers; decisions based both on their own interests, needs and goals, and on a thoughtful assessment of opportunities.

4. Student Support and Student Leadership Development
CTE students, indeed all students, come to schools and colleges with a range of needs that must be addressed in order for them to succeed in their studies and transitions to further endeavors. Needs may range from transportation, childcare and translation services, to mentoring and coaching for success in highly challenging CTE competitions and projects or transitions to new career opportunities. This section addresses the range of services and programs that support and reinforce technical and academic learning, with an emphasis on the relationships – organizational or personal – that make these programs work and support student success in CTE. It also includes outreach to students for enrollment in CTE, which, in itself, promotes learning and success. Stakeholders emphasized the importance of enrolling students into CTE programs, as a means to engage them and motivate and facilitate learning, and then of providing the support services necessary to ensure their success.

5. Industry Partnerships
The unique link between industry and education is an essential feature of CTE, and distinguishes it from other types of instructional designs and models. Industry partners play crucial roles in ensuring that CTE curricula are relevant and that students and educators have opportunities to explore their interests and learn important skills in the workplace.

6. System Alignment and Coherence
In order to support the academic and career and technical achievement of students in CTE programs it is essential that the components of the entire CTE system be effectively linked. System coherence incorporates several elements, including course sequencing, pathways, articulation, and coordination across sectors. Perkins IV, through its requirement that all local grant recipients implement at least one "program of study" and its support of articulation, emphasizes the importance of system alignment. "Programs of study" as defined in the Perkins Act must:

- Incorporate secondary education and postsecondary education elements;

- Include coherent and rigorous content, aligned with challenging academic standards, and relevant career and technical content in a coordinated, non-duplicative progression of courses that align secondary education with postsecondary education to adequately prepare students to succeed in postsecondary education.

They may also "include the opportunity for secondary education students to participate in dual or concurrent enrollment programs or other ways to acquire postsecondary education credits."

7. Effective Organizational Design
For CTE to prepare students to meet rigorous standards and become lifelong learners with employable skills, the K-12 and community college systems need to be designed in ways that enable student persistence and success. Minimally, this entails the development of organizational structures that enable faculty to collaborate, link business and industry with workplace learning, promote student enrollments, and encourage course and program completion.

8. System Responsiveness to Changing Economic Demands
For California's immense and diverse economy to retain its prosperity and competitive position in the global market, education must meet the demand for skilled workers in a wide range of industries. A "demand-driven" system is responsive to current real workforce development needs and labor market realities and predictions.

9. Skilled Faculty and Professional Development
A key element of quality CTE is the skill of its instructors and the existence of a sufficient pool of skilled instructors to adequately staff programs.

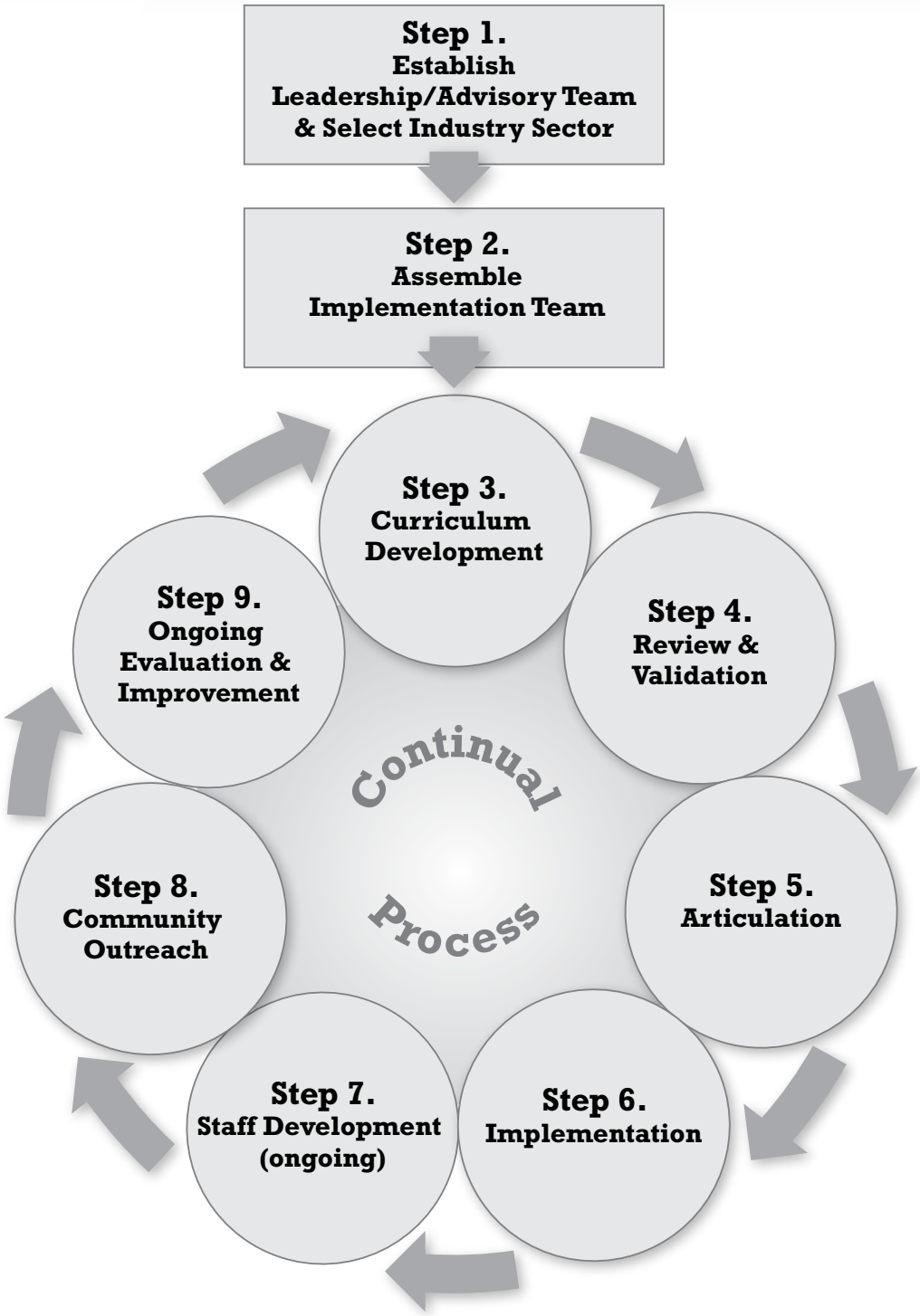
10. Evaluation, Accountability, and Continuous Improvement
Evaluation and accountability are key to any system or program improvement process and feature prominently in Perkins IV. Multiple accountability systems already exist in California to provide data that both meet specific requirements at the federal and state level and support program improvements efforts. These include systems mandated by the federal "No Child Left Behind" act, the Carl D. Perkins Act and the Workforce Investment Act, as well as state systems designed to provide an "Academic Performance Index" for schools, ensure continued funding for high-quality, high-demand community college programs in both segments. Given the multiplicity of existing accountability systems and, on the other hand, the intended integration of CTE into the very fabric of educational policy as a strategy to serve all students, any discussion of accountability must focus on utilizing, aligning, and expanding upon existing systems, and must emphasize program improvement along with reporting of compliance-driven data. Similarly, to the extent that such a system (or collection of systems) is intended to drive improvement in CTE for the benefit of all its customers – students, businesses, communities, and taxpayers statewide – it must report progress on measures that are meaningful to each of these groups.

11. CTE Promotion, Outreach, and Communication
As the foundation of California's workforce development system, and in its support of student learning, personal development, and career preparation, CTE offers myriad benefits to students, employers, state and regional economies, and communities. In order to ensure continued support for CTE, its benefits must be validated and made more widely known to students, parents, educators, counselors, community members and policy makers. This plan makes explicit the need to clearly communicate the benefits of CTE to each of these groups based on evidence of it impacts.

Notes:

Suggested Process for Developing Programs of Study

Once the *Programs of Study* team has reviewed the "Guiding Principles" in the previous section, the process of development may begin. This 9-step process outlines the suggested steps in developing *Programs of Study.*



Step 1: Establish Leadership/Advisory Team and Select Industry Sector

A *Leadership/Advisory Team* will oversee the development of *Programs of Study,* initiate the process and build political and financial support. The team may consist of individuals from the following groups:

- School district superintendents and related staff
- College presidents or their representatives
- Private industry council/WIB representatives
- Regional labor leaders

This team, in collaboration with local government officials, will evaluate the industry needs of the region. Industry sectors should be selected based on careers in high demand for local industry, as well as existing educational programs at the high school or postsecondary levels that have already achieved outstanding results. Research may include surveys of the labor market and student interest, as well as inquiries into financial, facility and staff support. Once research is complete and an industry sector is chosen, the *Leadership/Advisory Team* will assemble an *Implementation Team.*

Step 2: Assemble Implementation Team

The *Leadership/Advisory Team* selects and organizes the *Implementation Team*-a focused group of participants who will fully develop the *Programs of Study.* Because the programs extend from grade seven through a post-secondary degree or certificate, the team should include representation from the following groups:

- High school principal or designated representative
- College dean or representatives
- High school CTE teachers
- High school academic teachers
- College faculty in related disciplines
- Middle school representatives
- High school counselors
- Members of related industries
- Business & Industry representatives

After reviewing all steps of the development process, the *Implementation Team* will identify a career pathway within the suggested industry sector to develop into one or more *Programs of Study.* Note: Team members may change as needed throughout development of the curriculum.

Step 3: Curriculum Development

Members of the *Implementation Team* then begin developing the curriculum for the *Programs of Study.* The curriculum should address knowledge and skills essential for the Industry Sector, as well as national and state academic standards. The following criteria should be included:

- Meet state academic standards/A-G requirements
- Meet high school testing and exit requirements
- Meet career technical education standards
- Provide additional preparation to ensure college readiness
- Meet college entrance and placement requirements
- Meet Title V requirements
- Provide academic and career-related knowledge and skills within the chosen Industry Sector
- Provide opportunities to earn college credit through credit-based transition programs, including dual credit and articulation (see Step 5)

Instruction should be project- and work-based with students continuously progressing in knowledge and skills. Instruction should not be repeated and credit should be received for prior coursework wherever possible. This standards-based curriculum offers broad and durable technical instruction.

Step 4: Review

With the curriculum in place, the *Programs of Study* must be reviewed and approved by the *Leadership/ Advisory Team.*

The role of the *Leadership/Advisory Team* is as follows:

- Obtain business endorsement
- Discuss budgets, facilities, and equipment needs and support
- Evaluate the *Programs of Study* for success and relevancy
- Keep all stakeholders informed (including middle school, high school and postsecondary)

Any concerns raised by the *Leadership/AdvisoryTeam* will be addressed by the *Implementation Team.* The teams must come together to discuss budgetary and facility requirements, as well as staffing assignments for implementing the *Programs of Study.*

Step 5: Articulation

Whenever possible, Programs of Study should provide opportunities for students to earn college credit through credit-based transition programs. Members of the Implementation Team work together to:

- Offer dual credit courses between high school and college
- Seek regular articulation to ensure students will not have to repeat instruction
- Align high school and postsecondary courses by common standards and competencies
- Apply for statewide articulation

The continuing, seamless transition between courses is a defining feature of *Programs of Study*. It is important to determine measurable criteria for successful articulation. This may require revision of competencies so courses share similar outcomes. Common, written course competencies will aid in determining appropriate articulation strategies.

Step 6: Implementation

The educational sites need to be prepared for the project-based needs of the new *Programs of Study.* Necessary tools and equipment need to be purchased or acquired. Course scheduling may need adjusting to accommodate the combination of CTE and academic instruction. CTE instructors may need to be trained or updated to industry standards.

Comprehensive guidance counseling and academic advisement help students make informed decisions about which *Program of Study* to pursue. Support services need to be assembled for student counseling, assessment, etc. as well as facilities maintenance and accommodations for special need students. Comprehensive guidance counseling and academic advisement systems:

- Provide up-to-date access information to guidance, counseling, and advisement professional about *Programs of Study* offerings to aid students in their decision making
- Offer information and tools to help students learn about postsecondary education and career options, including prerequisites for particular *Programs of Study*
- Offer resources for students to identify their career interests and aptitudes and to select appropriate *Programs of Study*
- Provide information and resources for parents to help their children prepare for college and careers, including workshops on college and financial aid applications
- Offer web-based resources and tools for obtaining student financial assistance

Step 7: Implementation

For *Programs of Study* to remain effective, instructors and support staff must be up-to-date on current standards, processes, and technology. Sustained, intensive, and focused opportunities for administrators, teachers, and faculty foster *Programs of Study* design, implementation, and maintenance. Training should be provided in the following areas.

- CTE teachers and faculty trained to industry standards to align and integrate curriculum and instruction
- Academic and CTE teachers trained on the development of integrated academic and career and technical curriculum and instruction
- Instruction in new and emerging technologies
- Instruction in innovative teaching and learning strategies

In addition, instructors should be allowed adequate time to collaborate and develop their project and work-based curriculum.

Step 8: Marketing/Recruitment

Programs of Study and their benefits lack value if no one is aware of them. *Programs of Study* must be marketed to students, parents, educational staff, and the community. Students should be actively recruited. Continuous input and support from industry and colleges is essential for continuing the *Programs of Study.* Grant development should also be pursued to support the *Programs of Study.*

Step 9: Ongoing Evaluation and Improvement

An environment of continuous improvement is a key Perkins Act requirement and necessary for all successful *Programs of Study.* The programs should be regularly refined and updated, as needs change for students, the labor market or as technology advances. It is important to maintain an ongoing dialogue among secondary, postsecondary, and industry representatives.

Extensive data should be collected, shared, and considered in the following areas:

- Completion rate and drop out numbers
- Job placement
- Enrollment
- Articulation agreements
- Industry needs

Systems and strategies to gather quantitative and qualitative data on both *Programs of Study* components and student outcomes are crucial for ongoing efforts to develop and implement *Programs of Study.*

Well-designed accountability and evaluation systems should:

- Yield valid and reliable data on key student outcomes (indicators) referenced in Perkins and other relevant federal and state legislation
- Provide timely data to evaluate and improve the effectiveness of *Programs of Study*

Professional development for faculty, administrators, and counselors (see Step 7) also aids improvement by identifying new or updated standards to be considered during instruction.

The *Implementation Team* will set timelines for gathering data and discussing the results. They will set goals for increasing student success and update the *Programs of Study* as needed. *The Leadership/Advisory Team* will review the programs approximately every two to three months (or as needed) to ensure quality and real-world application.

Conclusion

There is no limit to the number of *Programs of Study* that could be implemented in any given school or school district. The number of programs developed will depend on available resources, facility access, student population and community support. This is why we recommend beginning with established, successful courses and building from there. The goal is to offer all students at least one pathway of interest, whether it is at his or her school or within an acceptable travel distance. In some areas, this may involve virtual/online instruction.

The *Programs of Study* process is never finished. Courses, requirements, industry standards and expectations are constantly changing; so must your *Programs of Study.*

For a further detailed reference on creating a standards-aligned CTE system there is a 269-page manual produced by the California County Superintendents Education Services Association (CCSESA). This document can be found online at www.ccsesa.org/resources or by contacting the California County Superintendents Education Services Association.

NOTES: _____

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Industry Sector: Transportation

Pathway: Vehicle Maintenance, Service, and Repair

California Sample Program of Study

Level	Grade	English Language Arts	Math	Social Studies	Science	Career Technical Education Course	Other Required Courses or Recommended Electives	
MIDDLE SCHOOL	7	Language Arts	Pre-Algebra	World History	7th Grade Science	Exploring Technology		
	8	Language Arts	Algebra	U.S. History	8th Grade Science	Technology Core		
SECONDARY	9	English 9	Geometry		Physical Science	Introduction to Transportation	P.E.	
	10	English 10	Algebra II	World History	Biology	Automotive Mechanics, Combination	P.E.	
	11	English 11		U.S. History		Engine Performance, Electrical Systems	Foreign Lang. Trigonometry/ Math Analysis	
	12	Technical Writing		U.S. Gov/Econ		Brakes, Suspension, Transmissions	Foreign Lang. Calculus	

Sample Occupations relating to this pathway (Including SOC Code)

Occupations requiring a high school diploma
- Mechanic's Assistant
- Lube Tech
- Parts & Sales
- Service Station Attendant

Occupations requiring some post-secondary
- Mechanic for independent shop
- Service Writer
- Licensed Smog Tech

Occupations requiring a 2 year Degree
- Automotive Master Technician
- Mechanic for Dealership
- Shop Foreman

Occupations requiring a BA/BS Degree
- Community College Instructor
- Automotive Corp. Service Rep
- Shop Manager

POSTSECONDARY

Articulated dual credit courses must be taken/moved to the secondary level for articulation/dual credit purposes.

Grade	Minimum Academic Requirements for AA Degree	CTE Sequence-First Semester	CTE Sequence-Second Semester
13		Occupational Safety & Health	Technical Computer Applications
14	*Semester/Quarter Units-Min per Area*	Principles of Engine Theory	Work Experience
	Area A-Natural Sciences (3/4)	Automotive Engine Lab	Technical Report Writing
	Area B-Social and Behavioral Sciences (3/4)	Automotive Electrical Systems Technology	Power Trains
		Engine Performance	Heating, A/C & Advanced Electronics
15	Area C-Humanities (3/4)	Preparing for Employment	Work Experience
	Area D-Languages and Rationality (3/4)	Work Experience	Exploring Welding & Metals
	Section 3-Ethnic Studies (as required)	Suspension, Steering, & Alignment	
16		Automotive Braking Systems	

Industry recognized certifications, licenses, credentials or apprenticeships related to this pathway.
- ASE Certifications
- Smog License
- Brake & Lamp
- OEM Certifications

Suggested Majors
- Transportation Management/Systems
- High school/community college Instructor credential
- Industrial Technology
- Business Administration for Automotive

Junior High/Middle School:	**Required Courses**
High School:	**Career Technical Education Courses**
Community College:	**Other Required Courses and Recommended Electives**
College/University:	**Dual/Concurrent Enrollment – Articulated Courses**
	Suggested Majors

Industry Sector:

Pathway:

California Template Program of Study

Level	Grade	English Language Arts	Math	Social Studies	Science	Career Technical Education Course	Other Required Courses or Recommended Electives		Sample Occupations relating to this pathway (Including SOC Code)
MIDDLE SCHOOL	7								Occupations requiring a high school diploma ➢ ➢ ➢
	8								
SECONDARY	9								Occupations requiring some post-secondary ➢ ➢ ➢
	10								Occupations requiring a 2 year Degree ➢ ➢ ➢
	11								Occupations requiring a BA/BS Degree ➢ ➢ ➢
	12								
POSTSECONDARY	Articulated dual credit courses must be taken/moved to the secondary level for articulation/dual credit purposes.								Industry recognized certifications, licenses, credentials or apprenticeships related to this pathway. ➢ ➢ ➢
	13								
	14								
	15								
	16								

Junior High/Middle School:	**Required Courses**
High School:	**Career Technical Education Courses**
Community College:	**Other Required Courses and Recommended Electives**
College/University:	**Dual/Concurrent Enrollment – Articulated Courses**

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Tech Prep Distribution Points

Providing Professional Development for Career Pathways